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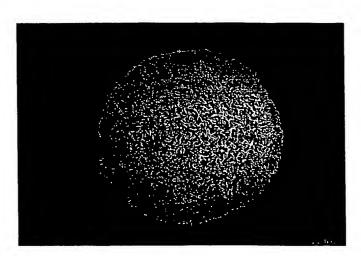
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(54) Title: DRUG DELIVERY PARTICLES AND METHODS OF TREATING PARTICLES TO IMPROVE THEIR DRUG DELIVERY CAPABILITIES



(57) Abstract: A first embodiment of the invention provides a method of engineering changes in the morphological, chemical or physical features of a particle, to promote, for example, the formation of hairs and pores on the surface of the particle. The presence of these engineered features facilitating the delivery of agents to a target region, such as beclomethasone to the alveoli of the lungs. Although the particle acts to deliver desired agents to a target region, the particle itself may also be an agent. The invention also provides particles specifically engineered by the above method so as to produce carrier particles suitable for particular tasks.



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Furt	ther documents are listed in the continuation of box C.	Patent family members are listed	in annex.				
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Patent document cited in search report	Publication date		Patent family member(s)	Publication date
EP 0508969 A	14-10-1992	AT	137671 T	15-05-1996
	arru	AT	208613 T	15-11-2001
		AÜ	662519 B2	07-09-1995
		AÜ	1534792 A	17-11-1992
		BG	61474 B1	30-09-1997
1		BG	98147 A	15-11-1994
1		CA	2106975 A1	12-10-1992
		CZ	9302116 A3	13-04-1994
		DE	69210601 D1	13-06-1996
		DE	69210601 T2	02-10-1996
1		DE	69232207 D1	20-12-2001
1		DE	69232207 T2	01-08-2002
		DK	580648 T3	16-09-1996
		DK	680752 T3	25-02-2002
		EE	2970 B1	15-04-1997
1		EP	0508969 A1	14-10-1992
		EP	0580648 A1	02-02-1994
		EP	0680752 A2	08-11-1995
1		ES	2086733 T3	01-07-1996
		ES	2168322 T3	16-06-2002
1		FI	934429 A	08-10-1993
		GR	3020602 T3	31-10-1996
-		HK	52497 A	02-05-1997
		HU	65095 A2	28-04-1994
		IE	921144 A1	21-10-1992
1		JP ar	3400999 B2 6506454 T	28-04-2003 21-07-1994
		JP JP	6506454 T 2003155228 A	27-05-2003
{		KR	216384 B1	16-08-1999
		NO	933575 A	06-10-1993
		PL	168232 B1	31-01-1996
		PT	680752 T	31-05-2002
İ		RO	115779 B1	30-06-2000
1		RU	2112507 C1	10-06-1998
		WO	9218110 A1	29-10-1992
		SG	43180 A1	17-10-1997
1		SK	108893 A3	09-03-1994
		US	5562923 A	08-10-1996
J		US	5874063 A	23-02-1999